ROLE OVERLOAD AND HEALTH BEHAVIORS: DEMONSTRATING ADAPTATION LONGITUDINALLY

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ABSTRACT

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Longitudinal approaches to studying the stressor-strain relationship, using theories like adaptation, have received increased attention in the literature. However, only psychological responses have been studied within the adaptation theory framework. As such, this study examines the adaptability of health behaviors (sleep quality, diet quality, and physical activity) in response to role overload in order to bridge this gap in the adaptation literature and provide insight into the dynamic relationship between workplace stressors and health behaviors. Participants (n = 520) completed five surveys, with one-month lags between assessments. Path analytic results indicate that people's health behaviors are negatively influenced by experiences of role overload within each time point; however, health behaviors adapt, or regress to previous levels, over time. Yet, the adaptation processes of the health behaviors did appear to differ, as sleep quality continued adapting to an experience of role overload across all time points, whereas diet quality and physical activity only demonstrated adaptation after one month. Results also suggest that sleep quality influences future experiences of role overload, such that poor sleep will make individuals more susceptible to future experiences of role overload. Theoretical and practical implications, as well as study limitations, are also discussed.

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INTRODUCTION

Adaptation theory describes the process in which people become accustomed to a stimulus, such that the resulting effects of the stimulus attenuate over time (Frederick & Lowenstein, 1999). Helson (1948, 1964) first proposed the general idea of adaptation in his automatic habituation model, where he suggested that psychological systems react to deviations from a set point. These automatic habituation processes allow constant stimuli to fade into the background so that resources can be directed towards novel stimuli requiring immediate attention (Frederick & Lowenstein, 1999). From this automatic habituation model, Brickman and Campbell (1971) developed the hedonic treadmill theory, wherein they proposed that people have immediate psychological responses to good and bad events, but that these emotions eventually return to baseline over time. Their theory is based on the idea that people continually strive to achieve greater happiness and, as such, continually readjust their goals following goal achievement or failure. Subsequently, this goal setting process readjusts people's levels of emotions back to their baseline levels (Diener, Lucas, & Scollon, 2006).

Since Brickman and Campbell's (1971) hedonic treadmill theory, research on adaptation has been growing in popularity, with emerging interest in applying the theory to better understand organizational based stressors. This increased interest in adaptation can be attributed to the call for more longitudinal research on the stressor-strain process (e.g., Zapf, Dormann, & Frese, 1996; Kelloway & Francis, 2013), as it has been argued that stressor-strain relationships observed concurrently (i.e., in cross-sectional designs) might not always function similarly within a longitudinal framework (Ployhart & Vandenberg, 2010).

As such, adaptation has been supported with psychological responses such as well-being (e.g., Matthews, Wayne, & Ford, 2014), life satisfaction (e.g., Lucas, Clark, Georgellis, &

Diener, 2003), and job satisfaction (e.g., Ritter, Matthews, & Henderson, 2015). Additionally, adaptation has been empirically demonstrated in response to a variety of stimuli, or stressors, including divorce (Lucas, 2005), widowhood and marriage (Lucas et al., 2003), unemployment (Lucas, Clark, Georgellis, & Diener, 2004), winning the lottery (Brickman, Coates, & Janoff-Bulman, 1978), managerial job changes (Boswell, Boudreau, & Tichy, 2005), work-family enrichment (Henderson, Matthews, & Trout, 2015), role conflict and role ambiguity (Ritter et al., 2015) and work-family conflict (Matthews et al., 2014).

However, responses, or strains, are typically categorized in three general classes, *psychological*, *physical*, and *behavioral* (Jex & Beehr, 1991). Surprisingly, as of yet, only psychological responses appear to have been studied within the framework of adaptation theory (e.g., Matthews et al., 2014). As such, there is currently a lack of published research regarding the adaptability of behavioral responses.

In response to this gap in the adaptation literature, this study examines the adaptability of health behaviors in response to role overload. Within the context of this study, behavioral adaptation can be conceptualized as a process in which a stimulus (i.e., stressor) causes an immediate behavioral response (i.e., strain); however, over time, that behavior will return to previous (i.e., baseline) patterns. For example, an increase in workload might cause an individual to have decreased sleep quality; however, as that person adapts to the increased workload, their sleep patterns should return to normal.

Health behaviors (sleep quality, diet quality, and physical activity) were selected as the behavioral responses for this study, as health behaviors have a major impact on people's health and functioning (e.g., Pilcher & Huffcutt, 1996). Furthermore, role overload was selected as the stressor of interest, as previous research has indicated that role stressors are concurrently linked to changes in health behaviors (e.g., Schultz, Wang, & Olson, 2010) and that people are capable of psychologically adapting to experiences of role stressors (e.g., Ritter et al., 2015).

The adaptability of health behaviors to role overload would have major implications for both theory and practice. Specifically, behavioral adaptation might challenge competing theories, such as the conservation of resources theory (COR; Hobfoll, 1989, 2001), which suggests that a decrease in health behavior (conceptualized as a resource) would result in further deterioration in health behavior (i.e., resource loss spirals; Hobfoll, 1989, 2001). Therefore, studying the adaptability of health behaviors would help to define the boundary conditions of both adaptation theory (i.e., applicability to behavioral strains), as well as other theories, such as COR. Furthermore, the adaptability of health behaviors would have numerous implications for practitioners concerned with worker health and functioning, as well as introduce a new perspective and novel approach to the study of behavior in numerous settings.

Health Behaviors

Health behaviors (sleep quality, diet quality, and physical activity) are the behavioral responses of interest in this study, as health behaviors have the characteristics necessary for adaptation. Specifically, health behaviors have been shown to decrease in response to stressors (i.e., concurrent negative relationship), yet they have also been shown to remain relatively stable over time.

Indeed, a plethora of studies have shown that health behaviors change in response to stressors. For example, Allen & Armstrong (2006) found that individuals experiencing increased work-family conflict engaged in less physical activity and greater unhealthy eating behaviors. Similarly, Devine et al. (2006) demonstrated that individuals chose unhealthy food options in response to work-family spillover and role overload, while Ng and Jeffery (2003) demonstrated that perceived stress was related to increased fatty food consumption and decreased physical activity. Additionally, a recent study by Doom and Haeffel (2013) showed that life stress was the best predictor of health behaviors, including physical activity and sleep. Studies have also shown that decreased levels of stress lead to increased positive health behaviors, including increased sleep, improved diet and increased physical activity (Moen, Kelly, Tranby, & Huang, 2011; Werneburg et al., 2010). On the other hand, longitudinal studies have shown that individuals display relatively stable health behaviors over their lifetime. For example, Kelder, Perry, Klepp, and Lytle (1994) showed that diet and physical activity are relatively stable after adolescence, while Ohayon, Carskadon, Guilleminault, and Vitiello (2004) found that there is only a slight systematic decrease in average sleep time (about 75 minutes) between the working ages of 20 to 65. These stable, long-term levels of health behaviors provide a baseline to which short-term fluctuations can regress.

Furthermore, health behaviors are of great interest for this study as they have been shown to have major effects on daily health and effective functioning. The intent of the following sections is to illustrate the negative consequences of health behaviors, not to provide a comprehensive review of the literature.

Sleep Quality. Empirical studies have shown that poor sleep quality (i.e., inadequate or disturbed sleep) is related to decreased functioning, as it has been linked to poorer mood states (Pilcher & Huffcutt, 1996), poorer self-regulatory capacity (Altena, Van Der Werf, Strijers, & Van Someren, 2008; Christian & Ellis, 2011), increased workplace deviance (Christian & Ellis, 2011), and decreased cognitive and motor performance (Bonnett, 1985; Bonnet & Arand, 2003; Pilcher & Huffcutt, 1996). Insufficient and disturbed sleep are also related to a variety of adverse health problems, including obesity (Cappuccio et al., 2008), cardiovascular disease (Ayas et al., 2003; Sabanayagam & Shankar, 2010), diabetes (Schultes, Schmid, Peters, Born, Fehm; 2005), and mortality (Cappuccio, D'Elia, Strazzullo, & Miller, 2010).

Diet Quality. Poor diet quality, which can include a high percentage of fatty foods, few fruits and vegetables and/or large amounts of sugar, is related to a variety of adverse health problems, such as diabetes, stroke and cardiovascular disease (Bucher, Hengstler, Schindler, & Meier, 2002; Esposito & Giugliano, 2005; Lin, O'Connor, Whitlock, & Beil, 2010; Ness & Powles, 1997). Poor diet quality is also linked to decreased functioning, as it has been shown to decrease cognitive performance (Kalmijn et al., 2004; Wengreen, Neilson, Munger, & Corcoran, 2009).

Physical Activity. As with sleep and diet quality, physical activity has also been linked to a variety of adverse health problems, such as diabetes and heart disease (Waxman, 2003; Whooley et al., 2008). Furthermore, physical activity is associated with increased functioning, as studies have shown it is positively related to positive mood states (Penedo & Dahn, 2005) and negatively related to burnout and absenteeism (Sliter & Sliter, 2014).

The decreased health and functioning resulting from poor health behaviors can have major consequences for the individual. For example, decreased health can increase medical expenses, which can be especially burdensome for those with a low income or who are forced to pay out-of-pocket (Berki, 1986). Additionally, increased absenteeism (due to illness) and decreased presenteeism (on-the-job productivity) due to poor health and functioning (Goetzel et al., 2004) can potentially result in a variety of adverse outcomes, such as job loss (Leigh, 1985), which, in turn, can lead to serious psychological and financial problems for the individual (Hanisch, 1999).

The decreased health and functioning resulting from poor health behaviors can also have major consequences for employers. Most notably, increased absenteeism and decreased presenteeism are associated with increased health care costs and inefficiencies that can have severe economic consequences for the organization (Goetzel et al., 2004). For example, it is estimated that heart disease costs organizations an average of $368 per person annually, when accounting for disease prevalence and total cost of health, absence, short-term disability, and productivity losses (Goetzel et al., 2004). These outcomes exemplify the vital importance that health behaviors have on individuals and employers alike, and suggest that we need to better understand the impact that stressors have on their short and long-term levels.

Role Overload

Role theory (Parsons, 1951) explains roles as the expectations people hold for their own behaviors and those of others within specific social contexts (e.g., work, spouse, parent, etc.; Biddle, 1986). Therefore, when individuals are provided with inconsistent or excessive role demands, they are likely to experience role strain (Rizzo, House, & Lirtzman, 1970). These role demands, or stressors, can manifest as role conflict, role ambiguity, or role overload (Orpen, 1982).

In this study, the role stressor of interest is role overload. *Role overload* is defined as “an individual’s lack of the personal resources needed to fulfill commitments, obligations, or requirements” (Peterson et al., 1995). In the work context, role overload typically causes individuals to have increased feelings that their work is unmanageable, and is usually the result of increased expectations and responsibilities along with longer working hours (Andrews, Kacmar & Kacmar, 2014). Role overload was selected because it has been linked to numerous health behaviors, including sleep quality (Schultz et al., 2010), diet quality (Devine et al., 2006), and physical activity (Lovell & Butler, 2014). Furthermore, recent research has supported adaptation in response to role stressors, such as role conflict and role clarity (Ritter et al., 2015). Based on its relevance to health behaviors and the previously demonstrated adaptability to role stressors in general, role overload appears to be an ideal stressor for the study of health behavior adaptation.

By studying behavioral responses to stressors over time, we will be able to build a more comprehensive view of adaptation, as well as gain a better understanding of the relationship between health behaviors and role overload over time. If supported, the adaptability of health behaviors could have major implications for individuals as well as organizations. For example, by showing behavioral adaptability, this study could show organizations that small increases in stressors could have little effect on long term employee health behavior, which could allow organizations to make small changes that could help benefit their organization.

In line with previous stress and adaptation research (e.g., Allen & Armstrong, 2006), it can be assumed that higher levels of a stressor (i.e., role overload) will be concurrently associated with increased stains (i.e., reduced health behaviors).

H_{1a}: Role overload is negatively related to sleep quality within a specified time point (i.e., the concurrent effect is negative).

H_{1b}: Role overload is negatively related to diet quality within a specified time point (i.e., the concurrent effect is negative).

H_{1c}: Role overload is negatively related to physical activity within a specified time point (i.e., the concurrent effect is negative).

Ideally, research on adaptation should measure baseline levels of a stressor and strain and then manipulate the stressor to examine the changes in the response over time.

Unfortunately, this methodology presents many problems for adaptation researchers. Realistically, many stressors and strains fluctuate; therefore, measuring a stressor and strain at a single time point may not accurately reflect baseline (Matthews et al., 2014). For example, an individual may have a very light workload and frequently engage in exercise, in general. However, that individual may be forced to stay late at work one week and, as a result, feel increased work overload (i.e., stressor) and thus have less time and energy to exercise (i.e., strain response). If the individual's work overload and exercise behavior are assessed during that time, then the individual's baseline is not accurately represented. Given these fluctuations, obtaining true baseline measures of stressors and responses is unrealistic. Instead, more creative methods of measuring adaptation must be employed. One such method includes measuring changes in a stressor-response relationship over time, while controlling for preexisting levels of the stressor and response (Kenny, 1975). This cross-lagged correlation allows researchers to measure adaptation between stressors and strains without obtaining any baseline measures.

Using this cross-lagged method, adaptation is observed when, after controlling for the negative concurrent relationship between stressors and responses, the lagged relationship between these stressors and responses is *positive,* or vice versa (Henderson et al., 2015; Matthews et al., 2014; Ritter et al., 2015). For example, Ritter et al. (2015) found that role conflict and job satisfaction were negatively related concurrently; however, the constructs were positively related after controlling for previous levels of role conflict and job satisfaction. This positive relationship does not mean that role conflict is increasing job satisfaction. Rather, it is reflecting the individual's adaptation to the stressor (i.e., role conflict) and the individual's regression to previous levels of the response (i.e., job satisfaction). Therefore, in line with this previous adaptation research, it is expected that role overload will be associated with greater health behaviors over time, after accounting for preexisting levels of health behaviors and experiences of role overload.

H_{2a}: Role overload has a positive cross-lagged relationship with sleep quality.

H_{2b}: Role overload has a positive cross-lagged relationship with diet quality.

H_{2c}: Role overload has a positive cross-lagged relationship with physical activity.

Previous research has found evidence of reverse causation between numerous stressors and responses, such as work-family conflict and well-being (Matthews et al., 2014). Specifically, reverse causation refers to responses that predict future levels of stressors. Reverse causation is a key component of the conservation of resources (COR) model, which suggests that resource loss (or gain) will beget resource loss (or gain) (Hobfoll, 2001). For example, Barber, Munz, Bagsby, & Powell, (2010) suggest that sufficient sleep may be conceptualized as a resource that can minimize strain. Therefore, it is possible that health behaviors could have a reciprocal relationship with role overload.

H_{3a}: Sleep quality has a negative cross-lagged relationship with role overload.

H_{3b}: Diet quality has a negative cross-lagged relationship with role overload.

H_{3c}: Physical activity has a negative cross-lagged relationship with role overload.

If adaptation is supported, exploratory analyses will be performed to examine the temporal nature of health behavior adaptation to role overload, as previous research has shown that the temporal nature of adaptation can vary depending on the stressor and response being examined (Diener et al., 2006; Uglanova & Staudinger, 2012). Therefore, it may be that one health behavior (e.g., sleep quality) adapts more quickly to role overload than another health behavior (e.g., physical activity). Additionally, due to the small number of measurement points and the time variability between measurements of previous adaptation studies, the exact temporal nature of adaptation in response to stressors, especially minor stressors, has yet to be thoroughly examined. For example, Ritter et al. (2015) and Henderson et al. (2015) only collected measurements at three and two time points, respectively. Matthews et al. (2014) collected data from participants over four time points; however, the time lag between each time point varied from one month to 6 months. With consistently spaced measurements (i.e., one-month time lags) over five time points, this study could provide more detailed information regarding the timeframe in which adaptation occurs.

RQ_1: What is the timeframe of behavioral (sleep quality, diet quality, physical activity) adaptation to role overload?

METHODS

Participants and Procedure

Participants were recruited through Amazon's Mechanical Turk (MTurk). Although this method of data collection has been questioned in the past, scholars are now suggesting that this sample population might be more representative and generalizable than many other samples used in organizational research (e.g., Buhrmester, Kwan, & Gosling, 2011; Casler, Bickel, & Hackett, 2013; Highhouse & Zhang, 2015). To ensure data quality (Goodman, Cryder, & Cheema, 2013; Mason & Suri, 2012), only U.S. participants with a 96% approval rate (i.e., 96% of their prior tasks had been approved) and who had previously completed at least 1,000 tasks were allowed to participate. Additional inclusion criteria consisted of 1) at least 24 hours of work per week and 2) working for the same employer for at least one month. Participants who met the inclusion criteria were requested to complete the study questionnaire across five separate time points with a one-month lag between each assessment. Validation questions (e.g., "In order to show that you are carefully reading the interview questions, please leave this item blank") were also used to ensure effortful responding.

The Time 1 survey had 987 respondents; of these, only 924 respondents were retained (based on inclusion criteria and effortful responding) and asked to complete surveys 2 through 5. These surveys utilized one-month lags between measurements, as previous adaptation studies have supported the efficacy of one-month to three-month lag intervals (Matthews et al., 2014; Uglanova & Staudinger, 2012), while periods of more than three months have been shown to distort adaptation trajectories (Uglanova & Staudinger, 2012). To be retained for analysis, respondents had to participate in all five waves of data collection. This resulted in a final analysis sample of 520 respondents. According to Ford et al. (2014) and Uglanova & Staudinger (2013), a lagged-effects study, such as this, requires approximately 500 participants.

The analysis sample was 47.3% male, 81.5% Caucasian, and 57.5% were married or living with a partner. On average, the sample was 36.90 years of age (*SD* =10.18), had an organizational tenure of 6.16 years (*SD* = 4.86), and worked 41.10 hours a week (*SD* = 6.28). Approximately 45.4% of participants reported working in management, professional and related occupations, 25.8% in sales and office occupations, 16.9% in service occupations, 7.9% in production, transportation, and material moving occupations, and 4.0% in natural resources, construction, and maintenance occupations. These figures align with recent census data (Unites States Census Bureau, 2012), which supports the generalizability of this sample to the U.S. working population.

Measures

Role Overload. Role overload was measured using a five-item work overload survey developed by Matthews, Kath, and Barnes-Farrell (2010; see Appendix A). This scale is a modified version of the scale reported on by Thiagarajan, Chakrabarty, and Taylor (2006), which is an abbreviated version of a measure developed by Reilley (1982). The items include “I have to do things that I do not really have the time and energy for,” “I need more hours in the day to do all the things that are expected of me,” “I cannot ever seem to catch up,” “I do not ever seem to have any time for myself,” and “There are times when I cannot meet everyone’s expectations.” Respondents use a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) to indicate agreement with the items. Higher scores indicate greater perceived work role overload. The total role overload score was computed by averaging the scores for all 5 items. Previous studies have shown that the measure has acceptable reliability and validity (Booth & Matthews, 2012; Matthews et al., 2010).

Sleep Quality. Sleep quality was measured using four items from Scott and Judge's (2006) daily level study on insomnia (see Appendix B). This measure asks "To what extent did you experience the following symptoms this month?" with participants reporting four symptoms: "trouble falling asleep," "trouble staying asleep (including waking up too early)," "woke up several times during the night," and "woke up after your usual amount of sleep feeling tired and worn out" (originally adapted from Jenkins, Stanton, Niemcryk, & Rose, 1988). Respondents use a 5-point scale ranging from 1 (*to a very small extent*) to 5 (*to a very large extent*) to indicate agreement with items. All items were reverse coded so a higher score would reflect better sleep quality. The total sleep quality score was computed by averaging the scores for all 4 items. The measure has been shown to have acceptable reliability and validity (Barber, Barnes, & Carlson, 2013; Greenberg, 2006).

Diet Quality. Diet quality was measured using the 13-item Rapid Eating Assessment for Participants – Shortened Version (REAP-S; Segal-Isaacson, Wylie-Rosett, & Gans, 2004; see Appendix C). The REAP-S was designed to quickly assess the dietary and eating habits of prediabetes patients and is listed in the National Cancer Institute's Register of Validated Short Dietary Assessment Instruments. Example items include "Eat 4 or more meals from sit-down or take out restaurants?" "Eat fried foods such as fried chicken, fried fish, or french fries?" and "Eat sweets like cake, cookies, pastries, donuts, muffins, chocolate and candies more than 2 times per day?" Respondents use a 3-point scale ranging from 1 (*rarely/never*), 2 (*sometimes*) to 3 (*usually/often*). All items were reverse coded so a higher score would reflect better diet quality. The total REAP-S score was computed by averaging the scores for all 13 items. Previous studies have demonstrated that the measure has acceptable reliability and validity (Segal-Isaacson et al., 2004; Segal-Isaacson et al., 2008).

Physical Activity. Physical activity was measured using the 4-item Concise Physical Activity Questionnaire (CPAQ; Sliter & Sliter, 2014; see Appendix D). The CPAQ measures aerobic activity and muscle-strengthening activity over a one-month period. Respondents indicate the approximate number of days per week in the past month that they have engaged in each type of physical activity for at least 20 consecutive minutes. The types of physical activity that are measured include "light aerobic activity," "moderate aerobic activity," vigorous aerobic activity," and "muscle-strengthening activity." Respondents use a 5-point scale ranging from 0 (*physically unable/not medically allowed to do this/chose not to do this*), 1 (*1 day per week or less*), 2 (*2-3 days per week*), 3 (*4-5 days per week*), to 4 (*6-7 days per week*). The scale was generated based on past physical activity research, Center for Disease Control guidelines, and input from health professionals, and was designed to be administered in a survey setting. Scores for the CPAQ were computed using the scoring method recommended by the scale developers (Sliter & Sliter, 2014). This method includes multiplying each individual's responses to item 3 (vigorous aerobic activity) by 2.5 and then summing the unweighted responses to items 1, 2, and 4, and the weighted response to item 3. The CPAQ is a relatively new measure, but it has shown acceptable measures of consistency and validity (Sliter & Sliter, 2014).

Contextual Variables. Although this study is concerned with adaptation in the general population, potential confounding variables must be taken into consideration. For example, gender (Azevedo et al., 2007), age (Azevedo et al., 2007; Sallis, 2000), and socioeconomic status (Azevedo et al., 2007; James, Nelson, Ralph, & Leather, 1997; Moore, Adler, Williams, &

Jackson, 2002) have all been linked to variability in health behavior. Therefore, these variables will be measured and used as statistical controls, if necessary.

RESULTS

Preliminary Results

Means, standard deviations, reliabilities, and correlations are reported in Tables 1, 2, and 3 (see Appendix B; separate tables are reported for each outcome of interest to facilitate presentation of the data).

Sample Differences

A series of one-way analysis of variance (ANOVA) tests were conducted to determine if systematic differences exist between the analysis sample (n = 520), the sample of participants who only responded to the first survey (n = 84), and the sample of participants who responded to multiple but not all surveys (n = 320). As reported in Table 4, there were no differences between samples on diet quality, physical activity, gender, or SES. However, there were slight differences in role overload, sleep quality, and age (see Tables 1, 2, and 3). Taken together, no strong evidence exists of systematic biases due to attrition.

Hypothesis Testing

Following the procedures in past adaptation research (Matthews et al., 2014), a series of models was used to examine the study hypotheses. The relationship between role overload and the three health behaviors were tested separately (a different path analysis for each health behavior), as trying to develop arguments for the temporal ordering between the health behaviors was beyond the scope of the present study. A path analytic approach within Amos 21 was used to test the following four nested models.

Model 1 examined the autoregressive effects, or temporal stability, between constructs. Specifically, each measure was set to predict all future measures of the same construct. For example, role overload at Time 1 was set to predict role overload at Time 2, Time 3, Time 4, and

Time 5; role overload at Time 2 was set to predict role overload at Time 3, Time 4, and Time 5; role overload at Time 3 was set to predict role overload at Time 4 and Time 5; and role overload at Time 4 was set to predict role overload at Time 5. The same was done for sleep, diet quality, and physical activity.

Model 2 extended Model 1 with the addition of concurrent direct effects. For example, within each time point, role overload was set to predict sleep, diet quality, and physical activity.

Model 3 extended Model 2 with the addition of cross-lagged effects from role overload to sleep, diet quality, and physical activity in the next time point (one month lag). For example, role overload at Time 1 was set to predict sleep, diet quality and physical activity at Time 2.

Model 4 extended Model 3 with the addition of cross-lagged effects of sleep, diet quality, and physical activity on role overload. For example, sleep, diet quality, and physical activity at Time 1 was set to predict role overload at Time 2. Similar pathways (e.g., concurrent direct effects, cross-lagged effects) were held constant across time points (Meier & Spector, 2013).

Model fit was expected to improve as the model complexity increased, such that Model 4 would demonstrate the best statistically significant overall fit. Theoretically, Model 4 should be the best representation of the theoretical arguments drawn from past adaptation research as it supports all of the study hypotheses. Improvement in model fit was assessed using a chi-square difference test for the successive nested models, as well as additional measures (i.e., comparative fit index [CFI] and root mean square error of approximation [RMSEA]). A CFI value of .95 or higher and a RMSEA value of .06 or lower indicate a good model fit (Hu & Bentler, 1999).

As reported in Table 5, Model 4 shows the best fit for sleep quality ($\chi^2(34) = 213.26$, $p < .001$, CFI = .96, RMSEA = .10). Given the parsimony of the model, the relatively high RMSEA value is not that surprising (Kenny & McCoach, 2003). These results support all three hypotheses. Specifically, 1) there is a negative concurrent relationship between role overload and sleep quality, 2) there is a positive lagged relationship between role overload and future sleep quality (in other words, sleep quality adapts to experiences of role overload), and 3) there is a negative relationship between sleep quality and future experiences of role overload.

Interestingly, Model 3 demonstrates the best fit for diet quality (χ^2 (35) =188.62, $p <$ .001, CFI = .96, RMSEA = .09) and physical activity (χ^2 (35) = 202.08, $p < .001$, CFI = .96, RMSEA = .10). These results support the first two hypotheses, but not the reverse causation hypothesis. Specifically, diet quality and physical activity do adapt to instances of role overload; however, these changes in behavior do not influence future experiences of role overload. Corrected correlations and visual representations of the best fitting models can be found in Tables 6, 7, and 8 and Figures 1, 2, and 3.

Research Question

To test the research question concerning the timeframe of adaptation, additional paths from role overload to future health behaviors were added to the best fitting model for each health behavior. Specifically, for sleep quality, paths were added to Model 4 from role overload to sleep quality with two, three, and four-month lags. As reported in Table 9, the new model fit the data well (χ^2 (31) = 172.95, $p < .001$, CFI = .97, RMSEA = .09) and suggests that sleep quality continues adapting to experiences of role overload as long as 4 months after the experience of role overload. Corrected correlations for this new model can be found in Tables 10. For diet quality and physical activity, paths were added to Model 3 (the best fitting model for these health behaviors) from role overload to diet quality and physical activity with two, three, and four-month lags. The news models did not show improvement in fit (diet quality, χ^2 (31) = 181.62, p < .001, CFI = .97, RMSEA = .10; physical activity, χ^2 (31) = 199.31, $p < .001$, CFI = .96, RMSEA = .10), which suggests that diet quality and physical activity typically adapt within one month of the role overload experience.

DISCUSSION

Previous adaptation research has demonstrated that strain responses are capable of adapting to stressors over time (e.g., Lucas et al., 2003; Matthews et al., 2014; Ritter et al., 2015). However, these studies have been limited to psychological responses, thus leaving a major gap in the literature in regards to other classes of responses (e.g., behavioral). This study addresses this void in the literature by examining the adaptability of behavioral strains.

Based on the results of this study, health behaviors (sleep quality, diet quality, and physical activity) do indeed appear to adapt to experiences of work stressors, such as role overload. Specifically, in the short term, role overload was associated with lower health behavior quality. However, despite these immediate negative effects, people's behaviors recover over time through some form of adaptation and remain fairly resilient over time. As such, the results of this study provide an empirical explanation for why people's health behaviors tend to remain relatively stable across the adult years (Kelder et al., 1994; Ohayon et al., 2004). This is a critical process to recognize given that a large amount of concurrent research has shown a strong negative relationship between stressors and health behaviors (e.g., Allen & Armstrong, 2006; Doom & Haeffel, 2013).

To this end, these findings seem to contradict numerous theories regarding behavior, including conservation of resources theory (COR; Hobfoll, 1989, 2001) and allostatic load theory (McEwen, 1988), which posit that behavior should be incrementally impaired with increased exposure to stressors. Therefore, in addition to extending the applicability of adaptation theory to behavioral responses, this study also places valuable boundary conditions on these competing theories.

In addition to demonstrating behavioral adaptation, the results of this study also show that sleep quality influences future experiences of role overload. This finding aligns with research by Barber and Munz (2011), who found that sufficient sleep predicts improvements in psychological strain. Together, these findings indicate that sleep is a necessary process for reducing future stress. Diet quality and physical activity, however, do not show these buffering effects. It is possible that diet quality and physical activity, although linked to psychological health and well-being (McAuley & Rudolph, 2010; Miller, 1996), have a lesser impact on psychological processes than sleep.

Finally, the analyses of the proposed research question (regarding the adaptation timeframe) demonstrate that sleep quality continues adapting to experiences of role overload, even after periods of time as long as four months. In fact, the largest rate of adaptation occurs after three months of the role overload experience. This suggests that sleep quality adaptation is not an immediate process and requires time. The analyses also show that diet quality and physical activity only demonstrate adaptation after one month of the role overload experience. It may be that people’s diet and physical activity are extremely resilient and therefore adapt more quickly following an experience of a stressor. However, a more likely explanation is that these behaviors are less affected by role overload compared to sleep (as evidenced by the weaker concurrent relationships), and therefore can return back to previous levels much more quickly.

Ultimately, the results of this study demonstrate the natural resiliency of people to workplace stressors and the true dynamic nature of stressors and behavioral strains. As such, this study demonstrates the utility of using longitudinal research methodologies capable of capturing the long-term processes by which stressors affect behavior. Specifically, the current methodology was able to capture a complex process that has gone unnoticed in (and appear contradictory to) previous studies. As such, future stressor-strain research utilizing more complex longitudinal designs could potentially reveal other noteworthy processes or relationships between stressors and strains.

Practical Implications

Although this study is primarily aimed at advancing our theoretical understanding of adaptation theory and the stressor-strain process, this study does have two important practical implications that warrant discussion.

First, practitioners can incorporate this knowledge of adaptation into the development and assessment of health behavior interventions. Specifically, by accounting for the natural, yet somewhat delayed, resiliency of sleep behaviors to changes in the environment, practitioners can better develop and assess interventions aimed at improving sleep quality among workers. In other words, an intervention might cause immediate changes in sleep quality; however, it is likely that sleep quality will adapt to (or partially adapt to) the intervention over the proceeding months. As such, it is important for practitioners to obtain measures of sleep quality months after the intervention in order to assess the intervention's overall effectiveness (i.e., to see if there are any permanent changes in sleep quality). Meanwhile, interventions aimed at improving diet and physical activity can expect a quick, natural, adaptation process from most individuals. As such, one-month measurements following interventions might be representative of new diet and physical activity behaviors (i.e., the effectiveness of the intervention), as it is unlikely that the behaviors will continue adapting after that time.

Second, as noted before, practitioners can use the knowledge of reverse causation of sleep on future experiences of role overload as a potential intervention to reduce workplace stress. If sleep quality can indeed make individuals more resilient to experiences of future stressors, then encouraging employees to get better sleep or implementing a sleep intervention before an upcoming stressful work period (i.e., tax season for auditors) might help prevent lapses in health behaviors, or other strain responses.

Future Directions

Researchers are encouraged to use the results of this study as a platform for future research. Specifically, researchers are encouraged to examine the generalizability of behavioral adaptation with other stressors, behavioral responses, and specific contexts. For example, in the organizational context, a variety of workplace behaviors (e.g., counterproductive work behaviors, organizational citizenship behaviors, etc.) could be examined in response to a variety of chronic workplace stressors (e.g., work-family conflict, organizational citizenship pressure, etc.), as the adaptation process may vary in terms of strength and time between these constructs. Researchers should also consider tracking changes in behavior in response to major work stressors. For example, changing jobs or getting a promotion could be considered a major work stressor that should theoretically cause greater psychological and behavioral strain. As such, adaptation patterns in response to these major work events might differ from the relatively minor, chronic stressor captured in this study. Additionally, the adaptability of minor physical responses (e.g., headaches, sickness) could be examined, as they also appear to be absent from the adaptation literature. This research will help us better understand the adaptation process and allow us to put meaningful boundary conditions on adaptation theory.

Furthermore, research could be conducted to determine the mechanisms by which behavioral adaptation occurs. One possible explanation could be that psychological adaptation mediates behavioral adaptation. According to affective events theory (Weiss & Cropanzano, 1996), discrete events cause affective reactions that lead to subsequent behaviors. In other words, psychological strains mediate the relationship between stressors and behavioral strains. Indeed, this mediated model has been demonstrated with a variety of stressors and strains (e.g., Jex, Hughes, Storr, Baldwin, Conrad, & Sheehan, 1991). As such, the adaptation of psychological strains should result in the adaptation of behavioral strains. Additionally, within affective events theory, it is postulated that behaviors are more likely to be observed within a short time frame of the precipitating event (Weiss & Cropanzano, 1996). Thus, affective events theory suggests that the mediation process (i.e., from stressor to psychological strain to behavioral strain) is relatively quick. Therefore, the relatively fast mediation process (Weiss & Cropanzano, 1996) should result in adaptation patterns (i.e., temporal characteristics) similar to those of psychological adaptation.

Finally, although this study demonstrates the adaptability of health behaviors, it does not mean that health behaviors are unsusceptible to long-term change in response to role overload. Indeed, health behaviors may adapt, but they may not return to the exact, previous levels. For example, past adaptation research has shown that many outcomes (e.g., well-being) only partially regress to baseline (Diener et al., 2006). Thus, although this study demonstrates empirical evidence of adaptation, our methods are unable to assess if there are any permanent changes in health behaviors in response to work stressors and what the magnitude of these changes might be. As such, further research is needed to help clarify the extent of health behavior adaptation.

Limitations

As with any study, there are certain limitations that are worth noting. First, although this study has five time points at evenly spaced one-month intervals, which is more systematic and informative than any previous adaptation studies (e.g., Matthews et al., 2014; Ritter et al., 2015), it is difficult to know if the number of time points or lag intervals were appropriate for the constructs under consideration. Specifically, sleep quality continued adapting across all time points (a four-month time span); therefore, we do not know if that is the extent of adaptation or if individuals will continue adapting over longer periods of time. Similarly, diet quality and physical activity only demonstrated moderate adaptation after one month; therefore, the one-month time lag interval may have been inappropriate for these health behaviors. For example, it is possible that diet quality and physical activity could adapt within a week or two of a stressor, and therefore might be better captured with lags of one-week, as opposed to one-month.

Furthermore, the data in this study was analyzed using path analysis, which provides limited information about the relationship between constructs. For example, this analysis does not take into account the latent nature of the constructs, which could impact model fit. Additionally, path analysis only assesses between-person changes, as opposed to within-person changes. As such, it is recommended that future research conduct latent change analysis to examine the relationship between role overload and health behaviors, or other stressors and behavioral strains, at the within-person level.

Finally, researchers often criticize samples obtained from Amazon's Mechanical Turk, as they believe that MTurk samples are unusual in ways that might challenge the validity of studies (Goodman, Cryder, & Cheema, 2013). However, based on the aims of this study (theoretical advancement and theory application to the general working population), I argue that this population is an appropriate sample. Specifically, this sample has characteristics (e.g., occupation, age) more similar to that of the U.S. working population (United States Census Bureau, 2012) than samples obtained from individual organizations, specific industries, or undergraduate students. Indeed, academics are now beginning to defend Amazon's Mechanical

Turk as an ideal sample population for this type of organizational research (e.g., Buhrmester, Kwan, & Gosling, 2011; Casler, Bickel, & Hackett, 2013; Highhouse & Zhang, 2015).

CONCLUSION

This study demonstrates that the relationship between work stressors and health behaviors are dynamic and do not function the same concurrently as they do longitudinally. Specifically, stressors, such as role overload, have an immediate negative impact on health behaviors concurrently; however, over time, health behaviors regress back towards baseline levels. These results demonstrate the natural resiliency of people to stressors, which has important implications for research and practice in numerous health related fields. Additionally, these results demonstrate that sleep quality helps protect against future experiences of role overload, which could influence future policies and interventions to reduce workplace stress.

REFERENCES

Allen, T. D., & Armstrong, J. (2006). Further Examination of the Link Between Work-Family Conflict and Physical Health The Role of Health-Related Behaviors. *American Behavioral Scientist*, *49*(9), 1204-1221.

Altena, E., Van Der Werf, Y. D., Strijers, R. L., & Van Someren, E. J. (2008). Sleep loss affects vigilance: effects of chronic insomnia and sleep therapy. *Journal of Sleep Research*, *17*(3), 335-343.

Andrews, M., Kacmar, M., & Kacmar, C. (2014). The mediational effect of regulatory focus on the relationships between mindfulness and job satisfaction and turnover intentions. *Career Development International, 19*(5), 494-507.

Andreyeva, T. & Sturm, R. (2006). Physical Activity and Changes in Health Care Costs in Late Middle Age. *Journal of Physical Activity and Health, 3*, 6-19.

Ayas, N. T., White, D. P., Manson, J. E., Stampfer, M. J., Speizer, F. E., Malhotra, A., & Hu, F. B. (2003). *Archives of Internal Medicine, 163*, 205-209.

Azevedo, M. R., Araújo, C. L. P., Reichert, F. F., Siquiera, F. V., da Silva, M. C., & Hallal, P. C. (2007). Gender differences in leisure-time physical activity. *International Journal of Public Health, 52*(1), 8-15.

Barber, L. K., Barnes, C. M., & Carlson, K. D. (2013). Random and Systematic Error Effects of Insomnia on Survey Behavior. *Organizational Research methods, 16*(4), 616-649.

Barber, L. K., & Munz, D. C. (2011). Consistent-sufficient sleep predicts improvements in self-regulatory performance and psychological strain. *Stress and Health*, 27(4), 314-324.

Barber, L. K., Munz, D. C., Bagsby, P. G., & Powell, E. D. (2009). Sleep consistency and sufficiency: are both necessary for less psychological strain? *Stress and Health, 26*(3), 186-193.

Berki, S. E. (1986). A Look At Catastrophic Medical Expenses And The Poor. *Health Affairs, 5*(4), 138-145.

Biddle, B. J. (1986). Recent Developments in Role Theory. *Annual Review of Sociology, 12*, 67-92.

Bonnet, M. H. (1985). Effect of sleep disruption on sleep, performance, and mood. *Sleep: Journal of Sleep Research & Sleep Medicine, 8*(1). 11-19.

Bonnet, M. H., & Arand, D. L. (2003). Clinical effects of sleep fragmentation versus sleep deprivation. *Sleep Medicine Reviews*, *7*(4), 297-310.

Booth, S. M. & Matthews, R. A. (2012). Family-supportive organization perceptions: validation of an abbreviated measure and theory extension. *Journal of Occupational Health Psychology. 17*(1), 41-51.

Boswell, W. R., Boudreau, J. W., & Tichy, J. (2005). The relationship between employee job change and job satisfaction: the honeymoon-hangover effect. *Journal of applied psychology*, *90*(5), 882.

Brickman, P. & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. H. Appley (Ed.), *Adaptation level theory: A symposium* (pp. 287-302). New York: Academic Press.

Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology*, *36*(8), 917.

Bucher, H. C., Hengstler, P., Schindler, C., & Meier, G. (2002). N-3 polyunsaturated fatty acides in coronary heart disease: a meta-analysis of randomized controlled trials. *The American Journal of Medicine, 112*(4), 298-304.

Buhrmester, M., Kwang, T., & Gosling, S. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3-5.

Cappuccio, F. P., D'Elia, L., Strazzullo, P., & Miller, M. A. (2010). Sleep Duration and All-Cause Mortality: A Systematic Review and Meta-Analysis of Prospective Studies. *Sleep, 33*(5), 585-592.

Cappuccio, F. P., Taggart, F. M., Kandala, N. B., Currie, A., Peile, E., Stranges, S., & Miller, M. A. (2008). Meta-Analysis of Short Sleep Duration and Obeisity in Children and Adults. *Sleep, 31*(5), 619-626.

Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's MTurk, social media, and face-to-face behavioral testing. *Computers in Human Behavior, 29*(6), 2156-2160.

Christian, M. S. & Ellis, A. P. J. (2011). Examining the Effects of Sleep Deprivation on Workforce Deviance: A Self-Regulatory Perspective. *Academy of Management Journal, 54*(5), 913-934.

Devine, C. M., Jastran, M., Jabs, J., Wethington, E., Farell, T. J., & Bisogni, C. A. (2006). "A lot of sacrifices:" Work–family spillover and the food choice coping strategies of low-wage employed parents. *Social science & medicine*, *63*(10), 2591-2603.

Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: revising the adaptation theory of well-being. *American Psychologist, 61*(4), 305.

Doom, J. R., & Haeffel, G. J. (2013). Teasing apart the effects of cognition, stress, and depression on health. *American Journal of Health Behavior*, *37*(5), 610-619.

Esposito, K. & Giugliano, D. (2005). Diet and inflammation: a link to metabolic and cardiovascular diseases. *European Heart Journal*, 27(1), 15-20.

Ford, M. T., Matthews, R. A., Wooldridge, J. D., Mishra, V., Kakar, U., & Strahn, S. R. (2014). How do occupational stressor-strain effects vary with time? A review and meta-analysis of the relevance of time lags in longitudinal studies. *Work & Stress, 28*, 9-30.

Frederick, S., & Loewenstein, G. (1999). Hedonic adaptation. In *Well-being: The foundations of hedonic psychology* (Vol. Xii, pp. 302-329). New York: Russell Sage Foundation.

Goetzel, R. Z., Long, S. R., Ozminkowski, R. J., Hawkins, K., Wang, S., & Lynch, W. (2004). Health, Absence, Disability, and Presenteeism Cost Estimates of Certain Physical and Mental Health Conditions Affecting U.S. Employers. *Journal of Occupational & Environmental Medicine*, 46(4), 398-412.

Goodman, J., Cryder, C., & Cheema, A. (2013). Data collection in a flat world: The strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision Making, 26*(3), 213-224.

Greenberg, J. (2006). Losing sleep over organizational injustice: Attenuating insomniac reactions to underpayment inequity with supervisory training in interactional justice. *Journal of Applied Psychology, 91*(1), 58-69.

Hanisch, K. A. (1999). Job Loss and Unemployment Researrch from 1994 to 1998: A Review and Recommendations for Research and Intervention. *Journal of Vocational Behavior, 55*, 188-220.

Helson, H. (1948). Adaptation-level as a basis for a quantitative theory of frames of reference. *Psychological Review, 55*, 297-313.

Helson, H. (1964). Current trends and issues in adaptation-level theory. *American Psychologist, 19*, 26-38.

Henderson, A. A., Matthews, R. A., & Trout, R. C. (2015). Furthering the work-family adaptation model: An over time examination of enrichment and job satisfaction. Poster presented at the 11th international conference on Occupational Stress and Health, Atlanta, GA.

Highhouse, S. & Zhang, D. (2015). The new fruit fly for applied psychological research. *Industrial and Organizational Psychology, 8*(2), 179-183.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*, 513-524.

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology, 50*, 337-421.

Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

James, W. P. T., Nelson, M., Ralph, A., & Leather, S. (1997). Socioeconomic determinants of health: The contribution of nutrition to inequalities in health. *BMJ, 314*, 1545.Kahn, R., Wolfe, D., Quinn, R., Snoek, J., & Rosenthal, R. (1964). *Organizational stress: Studies in role conflict and ambiguity*. New York: Wiley.

Jex, S. & Beehr, T. (1991). Emerging theoretical and methodological issues in the study of work-related stress. *Research in personnel and Human Resource Management, 9*, 311-365.

Jex, S. M., Hughes, P., Storr, C., Baldwin, D. C. Jr., Conrad, S., & Sheehan, D. V. (1991). Behavioral consequences of job-related stress among resident physicians: the mediating role of psychological strain. *Psychological Reports, 69*(1), 339-349.

Kalmijn, S., Boxtel, M. P. J., Ocke, M., Verschuren, W. M. M., Kromhout, D. & Launer, L. J. (2004). Dietary intake of fatty acids and fish in relation to cognitive performance at middle age. *Neurology, 62*(2), 275-280.

Kelder, S. H., Perry, C. L., Klepp, K. I., & Lytle, L. L. (1994). Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. *American Journal of Public Health, 84*(7), 1121-1126.

Kelloway, E. & Francis, L. (2013). Longitudinal research and data analysis. In R. Sinclair, M. Wang & E. Tetrick (Eds.), *Research methods in occupational health psychology: measurement, design and data analysis*: 374-394. New York, NY: Routledge.

Kenny, D. A. (1975). Cross-lagged panel correlation: A test for spuriousness. *Psychological Bulletin, 82*(6), 887-903.

Leigh, J. P. (1985). The Effects of Unemployment and the Business Cycle on Absenteeism. *Journal of Economics and Business, 37*, 159-170.

Lin, J. S., O'Connor, E., Whitlock, E. P., & Beil, T. L. (2010). Behavioral counseling to promote physical activity and a healthful diet to prevent cardiovascular disease in adults: a systematic review for the US Preventive Services Task Force. *Annals of Internal Medicine*, *153*(11), 736-750.

Lovell, G. P. & Butler, F. R. (2014). Physical Activity Bheavior and Role Overload in Mothers. *Health Care for Women International, 14*, 1-14.

Lucas, R. E. (2005). Time does not heal all wounds: A longitudinal study of reaction and adaptation to divorce. *Psychological Science, 16*, 945-950.

Lucas, R. E., Clark, A. E., Georgellis, Y., & Diener, E. (2003). Reexamining adaptation and the set point model of happiness: reactions to changes in marital status. *Journal of personality and social psychology*, *84*(3), 527.

Lucas, R. E., Clark, A. E., Georgellis, Y., & Diener, E. (2004). Unemployment alters the set point for lie satisfaction. *Psychological Science, 15*, 8-13.

Mason, W. & Suri, S. (2012). Conductingg behavioral research on Amazon's Mechanical Turk. *Behavioral Research, 44*, 1-23.

Matthews, R. A., Kath, L. M. & Barnes-Farrell, J. L. (2010). A Short, Valid, Predictive Measure of Work-Family Conflict: Item Selection and Scale Validation. *Journal of Occupational Health Psychology, 15*(1), 75-90.

Matthews, R. A., Wayne, J. H., & Ford, M. T. (2014). A work–family conflict/subjective well-being process model: A test of competing theories of longitudinal effects. *Journal of Applied Psychology, 99*(6), 1173-1187.

McAuley, E. & Rudolph, D. L. (2010). Physical activity, aging, and psychological well-being. *JAPA, 3*(1), 67-96.

McEwen, B. 1998. Stress, adaptation, and disease: allostasis and allostatic load. *Annals of the New York Academy of Sciences, 84*, 33-44.

Meier, L. L., & Spector, P. E. (2013). Reciprocal effects of work stressors and counterproductive work behavior: A five-wave longitudinal study. *Journal of Applied Psychology*, 98(3), 529-539.

Miller, M. (1996). Diet and psychological health. *Alternative Therapies in Health and Medicine, 2*(5), 40-48.

Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011). Changing Work, Changing Health Can Real Work-Time Flexibility Promote Health Behaviors and Well-Being? *Journal of Health and Social Behavior*, *52*(4), 404-429.

Moore, P. J., Adler, N. E., Williams, D. R., & Jackson, J. S. (2002). Socioeconomic Status and Health: The Role of Sleep. *Psychosomatic Medicine, 64*(2), 337-344.

National Institutes of Health (2014, September 12). *A brief guide to the PROMIS Sleep Disturbance instruments*. Retrieved from https://www.assessmentcenter.net/documents/PROMIS%20Sleep%20Disturbance%20Scoring%20Manual.pdf

Ness, A. R., & Powles, J. W. (1997). Fruit and vegetables, and cardiovascular disease: a review. *International Journal of Epidemiology, 26*(1), 1-13.

Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviors in a sample of working adults. *Health Psychology, 22*(6), 638.

Ohayon, M. M., Carskadon, M. A., Guilleminault, C., Vitiello, M. V. (2004). Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normative sleep values across the human lifespan. *Sleep, 27*(7), 1255-1273.

Orpen, C. (1982). Type A Personality as a Moderator of the Effects of Role Conflict, Role Ambiguity and Role Overload on Individual Strain. *Journal of Human Stress, 8*(2), 8-14.

Parsons, T. (1951). Illness and the role of the physician: A sociological perspective. *American Journal of Orthopsychiatry, 21*(3), 452-460.

Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, *18*(2), 189-193.

Peterson, M. F., Smith, P. B., Akande, A., Ayestaran, S., Bochner, S., Callan, V., Cho, N. G., Jesuino, J. C., D'Amorim, M., Francois, P. H., Hofmann, K., Koopman, P. L., Leung, K., Lim, T. K., Mortazavi, S., Munene, J., Radford, M., Ropo, A., Savage, G., Setiadi, B., Sinha, T. N., Sorenson, R., & Viedge, C. (1995). Role conflict, ambiguity, and overload: A 21-nation study. *Academy of Management Journal*, *38*(2), 429-452.

Pilcher, J. J., & Huffcutt, A. J. (1996). Effects of sleep deprivation on performance: a meta-analysis. *Sleep: Journal of Sleep Research & Sleep Medicine, 19*(4). 318-326.

Ployhart, R. E., & Vandenberg, R. J. 2010. Longitudinal research: the theory, design, and analysis of change. *Journal of Management*, 36(1): 94-120.

Reilly, M. D. (1982). Working wives and convenience consumption. *Journal of Consumer Research, 8*, 407-418.

Ritter, K. J., Matthews, R. A., & Henderson, A. A. (2015). Adaptation to role stressors over time. In M. T. Ford, *Longitudinal perspectives on coping and adjustment to stressors*. Symposium presented at the 30th annual conference of the Society for Industrial and Organizational Psychology, Philadelphia, PA.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly, 15*(2), 150-163.

Sabanayagam, C. & Shankar, A. (2010). Sleep Duration and Cardiovascular Disease: Results from the National Health Interview Survey. *Sleep, 33*(8), 1037-1042.

Sallis, J. F. (2000). Age-related decline in physical activity: a synthesis of human and animal studies. *Medicine and Science in Sports and Exercise, 32*(9), 1598-1600.

Schultes, B., Schmid, S., Peters, A., Born, J., & Fehm, H. L. (2005). Sleep Loss and the Development of Diabetes: A Review of Current Evidence. *Experimental and Clinical Endocrinology & Diabetes, 113*, 563-567.

Schultz, K. S., Wang, M., & Olson, D. A. (2010). Role Overload and Underload in Relation to Occupational Stress and Health. *Stress and Health, 26*, 99-111.

Scott, B. A., & Judge, T. A. (2006). Insomnia, emotions, and job satisfaction: A multilevel study. Journal of Management, 32(5), 622-645.

Segal-Isaacson, C. J., Tobin, J. N., Weiss, S. M., Brondolo, E., Vaughn, A., Wang, C., Camille, J., Gousse, Y., Ishii, M., Jones, D., LaPerriere, A., Lydston, D., Schneiderman, N., & Ironson, G. (2006). Improving Dietary Habits in Disadvantaged Women With HIV/AIDS: The SMART/EST Women's Project. *AIDS and Behavior, 10*(6), 659-670.

Segal-Isaacson, C. J., Wylie-Rosett, J., & Gans, K. M. (2004). Validation of a Short Dietary Assessment Questionnaire: The Rapid Eating and Activity Assessment for Participants Short Version (REAP-S). *The Diabetes Eduacator, 30*(5), 774-781.

Sliter, K. A., & Sliter, M. T. (2014). The Concise Physical Activity Questionnaire (CPAQ): Its Development, Validation, and Application to Firefighter Occupational Health. *International Journal of Stress Management, 21*(3), 283-305.

Thiagarajan, P., Chakrabarty, S., & Taylor, R. D. (2006). A confirmatory factor analysis of Reilly's role overload scale. *Educational and Psychological Measurement, 66*, 657.

Uglanova, E. A. & Staudinger, U. M. (2013). Zooming in on Life Events: Is Hedonic Adaptation Sensitive to the Temporal Distance from the Event? *Social Indicators Research, 111*, 265-286.

United States Census Bureau. (2012). *Employed Civilians by Occupation—States 2010*. Retrieved from http://www.census.gov/compendia/statab/2012/tables/12s0617.pdf

Waxman, A. (2003). Prevention of chronic diseases: WHO global strategy on diet, physical activity and health. *Food and Nutrition Bulletin, 24*, 281–284.

Wengreen, H. J., Neilson, C., Munger, R., & Corcoran, C. (2009). Diet Quality Is Associated with Better Cognitive Test Performance among Aging Men and Women. *The Journal of Nutrition, 139*(10), 1944-1949.

Weiss, H. M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior: An annual series of analytical essays and critical reviews* (pp. 1–74). Greenwich, CT: JAI Press.

Werneburg, B. L., Herman, L. L., Preston, H. R., Rausch, S. M., Warren, B. A., Olsen, K. D., & Clark, M. M. (2011). Effectiveness of a multidisciplinary worksite stress reduction programme for women. *Stress and Health*, *27*(5), 356-364.

Whooley, M. A., de Jonge, P., Vittinghoff, E., Otte, C., Moos, R., Carney, R. M., Ali, S., Dowray, S., Na, B., Feldman, M. D., Schiller, N. B., & Browner, W. S. (2008). Depressive Symptoms, Health Behaviors, and Risk of Cardiovascular Events in Patients with Coronary Heart Disease. *JAMA, 300*(20), 2379-2388.

Yu, L., Buysse, D. J., Germain, A., Moul, D. E., Stover, A., Dodds, N. E., Johnston, K. L., & Pilkonis, P. A. (2011). Development of short forms from the PROMIS sleep disturbance and Sleep-Related Impairment item banks. Behavioral Sleep Medicine, 10(1), 6-24.

Zapf, D., Dormann, C., & Frese, M. (1996). Longitudinal studies in organizational stress research: A review of the literature with reference to methodological issues. *Journal of Occupational Health Psychology*, 1(2): 145-169.

APPENDIX A

Role Overload

Instructions
Thinking about your WORK life over the past month, please indicate the degree to which you agree with the following statements.

Role Overload
1. I have to do things that I do not really have the time and energy for
2. I need more hours in the day to do all the things that are expected of me
3. I cannot ever seem to catch up
4. I do not ever seem to have any time for myself
5. There are times when I cannot meet everyone's expectations

Response Scale
Items use a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

APPENDIX B

Sleep Quality

Instructions
To what extent did you experience the following symptoms this past MONTH?

Sleep Quality
1. Trouble falling asleep.
2. Trouble staying asleep (including waking up too early).
3. Woke up several times during the night.
4. Woke up after your usual amount of sleep feeling tired and worn out.

Response Scale
Items use a scale ranging from 1 (*to a very small extent*) to 5 (*to a very large extent*).

APPENDIX C

Diet Quality

Instructions
In the past MONTH, how often did you:

Diet Quality
1. Skip breakfast?
2. Eat 4 or more meals from sit-down or take out restaurants?
3. Eat less than 2 servings of whole grain products or high fiber starches a day? Serving = 1 slice of 100% whole grain bread; 1 cup whole grain cereal like Shredded Wheat, Wheaties, Grape Nuts, high fiber cereals, oatmeal, 3-4 whole grain crackers, 1⁄2 cup brown rice or whole wheat pasta, boiled or baked potatoes, yuca, yams or plantain?
4. Eat less than 2 servings of fruit a day? Serving = 1⁄2 cup or 1 med. fruit or 3⁄4 cup 100% fruit juice.
5. Eat less than 2 servings of vegetables a day? Serving = 1⁄2 cup vegetables, or 1 cup leafy raw vegetables.
6. Eat or drink less than 2 servings of milk, yogurt, or cheese a day? Serving = 1 cup milk or yogurt; 11⁄2 - 2 ounces cheese.
7. Eat more than 8 ounces (see sizes below) of meat, chicken, turkey or fish per day? Note: 3 ounces of meat or chicken is the size of a deck of cards or ONE of the following: 1 regular hamburger, 1 chicken breast or leg (thigh and drumstick), or 1 pork chop.
8. Use regular processed meats (like bologna, salami, corned beef, hotdogs, sausage or bacon) instead of low fat processed meats (like roast beef, turkey, lean ham; low-fat cold cuts/hotdogs)?
9. Eat fried foods such as fried chicken, fried fish, or French fries?
10. Eat regular potato chips, nacho chips, corn chips, crackers, regular popcorn, nuts instead of pretzels, low-fat chips or low- fat crackers, air-popped popcorn?
11. Add butter, margarine or oil to bread, potatoes, rice or vegetables at the table?
12. Eat sweets like cake, cookies, pastries, donuts, muffins, chocolate and candies more than 2 times per day?
13. Drink 16 ounces or more of non-diet soda, fruit drink/punch or Kool-Aid a day? Note: 1 can of soda = 12 ounces.

Response Scale
Items use a scale ranging from 1 (*rarely/never*), 2 (*sometimes*), to 3 (*usually/often*).

APPENDIX D

Physical Activity

Instructions
Please think about the past MONTH. During that time, approximately how many days per week did you engage in each of the following types of physical activity for at least 20 consecutive minutes?
Example 1. If you walk to work and it takes you 10 minutes each way, that would NOT count because the minutes were not consecutive.
Example 2. If you walk to work and it takes you 20 minutes each way, then that would count as performing light physical activity that day. You walked for at least 20 consecutive minutes that day.

Physical Activity
1. Light aerobic activity (Ex: Shopping, housework, leisurely walking)
2. Moderate aerobic activity (Ex: Brisk walking, bicycling, tennis)
3. Vigorous aerobic activity (Ex: Jogging/running, swimming laps, jumping rope)
4. Muscle-strengthening activity (Ex: Lifting weights, pilates, yoga)

Response Scale
Items use a scale ranging from 0 (*physically unable/not medically allowed to do this/chose not to do this*), 1 (*1 day per week or less*), 2 (*2-3 days per week*), 3 (*4-5 days per week*), to 4 (*6-7 days per week*).

APPENDIX E

Tables and Figures

Table 1

Descriptive Statistics for Sleep Quality

				Correlations								
Variable	Mean	SD	α	1	2	3	4	5	6	7	8	9
Time 1												
1. Role overload	2.75	1.00	.89			.						
2. Sleep quality	2.04	.89	.82	-.41								
Time 2												
3. Role overload	2.66	1.02	.91	.71	-.41							
4. Sleep quality	2.02	.89	.83	-.40	.75	-.48						
Time 3												
5. Role overload	2.67	1.05	.91	.74	-.42	.75	-.44					
6. Sleep quality	1.98	.91	.85	-.41	.73	-.46	.80	-.48				
Time 4												
7. Role overload	2.68	1.04	.92	.70	-.39	.74	-.42	.76	-.46			
8. Sleep quality	2.03	.96	.86	-.37	.70	-.43	.74	-.44	.78	-.50		
Time 5												
9. Role overload	2.61	1.10	.93	.69	-.35	.73	-.40	.73	-.40	.77	-.41	
10. Sleep quality	1.97	.92	.86	-.36	.71	-.42	.73	-.43	.74	-.44	.80	-.45

N = 520. All correlations significant at $p < .01$.

Table 2
Descriptive Statistics for Diet Quality

				Correlations								
Variable	Mean	SD	α	1	2	3	4	5	6	7	8	9
Time 1												
1. Role overload	2.75	1.00	.89			.						
2. Diet quality	1.80	.35	.73	-.17**								
Time 2												
3. Role overload	2.66	1.02	.91	.71**	-.13**							
4. Diet quality	1.76	.34	.72	-.15**	.75**	-.17**						
Time 3												
5. Role overload	2.67	1.05	.91	.74**	-.12**	.75**	-.12**					
6. Diet quality	1.75	.34	.73	-.11*	.72**	-.10*	.77**	-.10*				
Time 4												
7. Role overload	2.68	1.04	.92	.70**	-.15**	.74**	-.13**	.76**	-.09*			
8. Diet quality	1.74	.34	.74	-.12**	.72**	-.12**	.76**	-.10*	.79**	-.11**		
Time 5												
9. Role overload	2.61	1.10	.93	.69**	-.15**	.73**	-.14**	.73**	-.12**	.77**	-.14**	
10. Diet quality	1.74	.34	.75	-.14**	.71**	-.13**	.77**	-.11*	.76**	-.13**	.80**	-.16**

N = 520. ** *p* < .01. * *p* < .05.

Table 3

Descriptive Statistics for Physical Activity

				Correlations								
Variable	Mean	SD	α	1	2	3	4	5	6	7	8	9
Time 1												
1. Role overload	2.75	1.00	.89									
2. Physical activity	8.02	4.39	.72	-.13**								
Time 2												
3. Role overload	2.66	1.02	.91	.71**	-.14**							
4. Physical activity	7.82	4.53	.71	-.07	.77**	-.13**						
Time 3												
5. Role overload	2.67	1.05	.91	.74**	-.14**	.75**	-.11*					
6. Physical activity	7.94	4.47	.68	-.14**	.77**	-.15**	.81**	-.14**				
Time 4												
7. Role overload	2.68	1.04	.92	.70**	-.09*	.74**	-.10*	.76**	-.13**			
8. Physical activity	7.93	4.48	.70	-.08	.73**	-.11*	.80**	-.10*	.81**	-.11*		
Time 5												
9. Role overload	2.61	1.10	.93	.69**	-.07	.73**	-.06	.73**	-.11*	.77**	-.08	
10. Physical activity	7.82	4.63	.70	-.09*	.71**	-.14**	.79**	-.14**	.79**	-.12**	.81**	-.13**

N = 520. ** $p < .01$. * $p < .05$.

Table 4
Examination of Sample Differences

Variable	Analysis sample[a] (n = 520)	Time 1 only participants (n = 84)	Multiple time-point participants[b] (n = 320)	F	*df*
Age	36.90	32.55	32.95	18.70**	(2, 918)
Gender[c]	1.47	1.46	1.48	.05	(2, 917)
SES[d]	3.03	2.72	2.88	2.07	(2, 912)
Role overload	2.75	3.01	2.99	6.59**	(2, 921)
Sleep quality	2.96	2.78	2.67	10.10**	(2, 921)
Diet quality	1.20	1.14	1.15	2.40	(2, 919)
Physical activity	8.02	7.90	8.09	.07	(2, 855)

Note. [a]Participants who responded to all five waves of data collection. [b]Participants who responded to two, three or four waves of data collection. [c]1 = male, 2 = female.
** $p < .01$.

Table 5

Fit Statistic Information for Nested Models, Identifying Best Model for Hypothesis Testing

Model	χ^2	*df*	CFI	RMSEA	$\Delta\ \chi^2$	Δdf
Sleep quality						
Null Model	4507.42**	45	.00	.44		
Model 1	422.40**	37	.91	.14	4085.02**	8
Model 2	257.20**	36	.95	.11	165.20**	1
Model 3	233.87**	35	.96	.11	23.33**	1
Model 4	213.26**	34	.96	.10	20.61**	1
Diet quality						
Null Model	4318.98**	45	.00	.43		
Model 1	204.91**	37	.96	.09	4114.07**	8
Model 2	192.98**	36	.96	.09	11.93**	1
Model 3	188.62**	35	.96	.09	4.36**	1
Model 4	188.01**	34	.96	.09	.61	1
Physical activity						
Null Model	4454.19**	45	.00	.43		
Model 1	216.42**	37	.96	.10	4237.77**	8
Model 2	207.44**	36	.96	.10	8.98**	1
Model 3	202.08**	35	.96	.10	5.36**	1
Model 4	201.56**	34	.96	.10	.52	1

Note. N = 520. *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root-mean-square error of approximation. Model 1 = Autoregressive effects. Model 2 = Concurrent direct effects. Model 3 = Lagged effects. Model 4 = Reverse causation effects. ** $p < .01$.

Table 6

Model 4 Statistics for Sleep Quality

	Corrected Correlations								
Variable	1	2	3	4	5	6	7	8	9
Time 1									
1. Role overload			.						
2. Sleep quality	-.24**								
Time 2									
3. Role overload	.58**	-.08**							
4. Sleep quality	.11**	.63**	-.24**						
Time 3									
5. Role overload	.30**		.51**	-.07**					
6. Sleep quality		.21**	.09**	.56**	-.24**				
Time 4									
7. Role overload	.09**		.25**		.49**	-.07**			
8. Sleep quality		.08**		.18**	.09**	.53**	-.23**		
Time 5									
9. Role overload	.06*		.08**		.34**		.48**	-.07**	
10. Sleep quality		.03		.07**		.17**	.09**	.55**	-.24**

N = 520. ** *p* < .01. * *p* < .05.

Table 7

Model 3 Statistics for Diet Quality

	Corrected Correlations								
Variable	1	2	3	4	5	6	7	8	9
Time 1									
1. Role overload			.						
2. Diet quality	-.07**								
Time 2									
3. Role overload	.60**								
4. Diet quality	.04*	.65**	-.07**						
Time 3									
5. Role overload	.30**		.53**						
6. Diet quality		.25**	.04*	.56**	-.07*				
Time 4									
7. Role overload	.10**		.26**		.51**				
8. Diet quality		.14**		.21**	.04*	.55**	-.07**		
Time 5									
9. Role overload	.06*		.08**		.35**		.50**		
10. Diet quality		.03		.12**		.20**	.04*	.56**	-.07**

N = 520. ** *p* < .01. * *p* < .05.

Table 8
Model 3 Statistics for Physical Activity

	Corrected Correlations								
Variable	1	2	3	4	5	6	7	8	9
Time 1									
1. Role overload			.						
2. Physical activity	-.06**								
Time 2									
3. Role overload	.60**								
4. Physical activity	.05*	.67**	-.06**						
Time 3									
5. Role overload	.30**		.53**						
6. Physical activity		.28**	.04*	.59**	-.07**				
Time 4									
7. Role overload	.10**		.26**		.51**				
8. Physical activity		.08**		.24**	.04*	.56**	-.07**		
Time 5									
9. Role overload	.06*		.08**		.35**		.50**		
10. Physical activity		.04		.07**		.23**	.04*	.57**	-.07**

N = 520. ** *p* < .01. * *p* < .05.

Table 9

Fit Statistic Information for Nested Model, Identifying Best Model for Research Question

Model	χ^2	*df*	CFI	RMSEA	$\Delta\ \chi^2$	Δdf
Sleep quality						
Model 4	213.26**	34	.96	.10	20.61**	1
Model 5	172.95**	31	.97	.09	40.31**	3
Diet quality						
Model 3	188.62**	35	.96	.09	4.36**	1
Model 5	181.62**	31	.97	.10	7.00	4
Physical activity						
Model 3	202.08**	35	.96	.10	5.36**	1
Model 5	199.31**	31	.96	.10	2.77	4

Note. Model 5 was compared to the best fitting model during hypothesis testing. N = 520. *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root-mean-square error of approximation. Model 5 = Timeframe effects. ** $p < .01$.

Table 10

Model 5 Statistics for Sleep Quality

	Corrected Correlations								
Variable	1	2	3	4	5	6	7	8	9
Time 1									
1. Role overload									
2. Sleep quality	-.27**								
Time 2									
3. Role overload	.58**	-.08**							
4. Sleep quality	.05**	.61**	-.27**						
Time 3									
5. Role overload	.30**		.50**	-.07**					
6. Sleep quality	.07**	.23**	.05**	.53**	-.27**				
Time 4									
7. Role overload	.09**		.25**		.49**	-.07**			
8. Sleep quality	.08**	.11**	.06**	.19**	.04**	.51**	-.23**		
Time 5									
9. Role overload	.06*		.08**		.24**		.48**	-.07**	
10. Sleep quality	.06**	.06	.07**	.10**	.06**	.19**	.04**	.53**	-.27**

$N = 520$. ** $p < .01$. * $p < .05$.

Figure 1

Model 4 for Sleep Quality

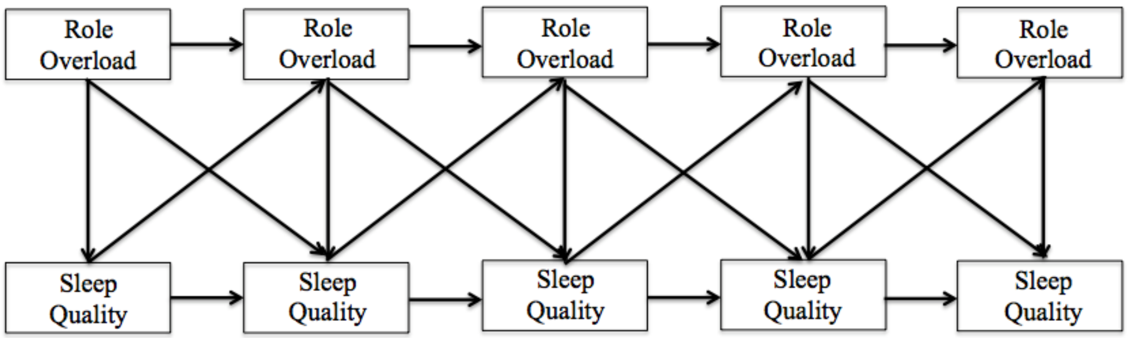

Figure 1. Model 4 for Sleep Quality. Autoregressive correlations between measurements separated by more than one month have been excluded from the figure for reasons of parsimony. Correlations can be found in Table 6.

Figure 2
Model 3 for Diet Quality

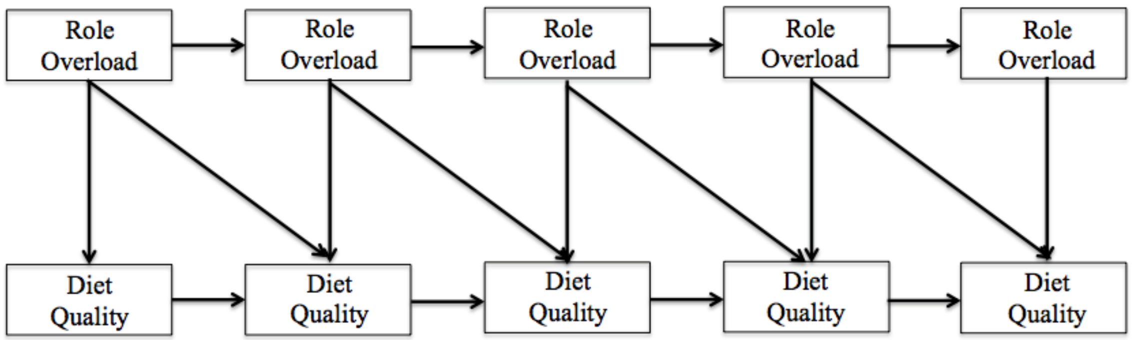

Figure 2. Model 3 for Diet Quality. Autoregressive correlations between measurements separated by more than one month have been excluded from the figure for reasons of parsimony. Correlations can be found in Table 7.

Figure 3
Model 3 for Physical Activity

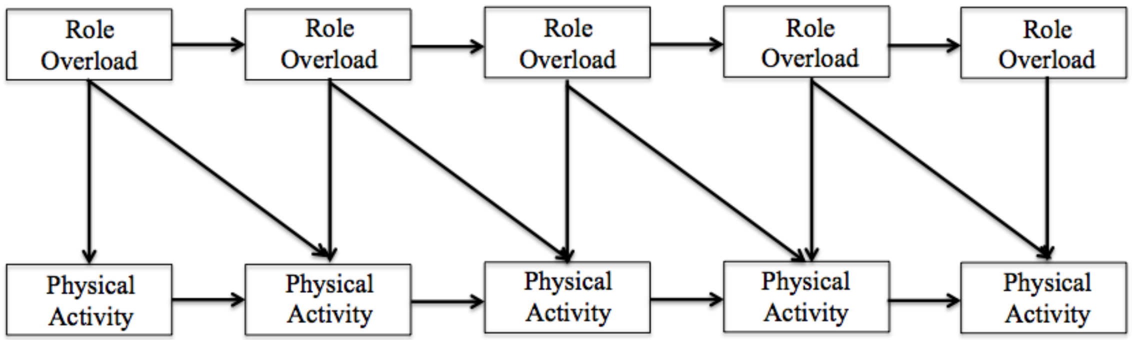

Figure 3. Model 3 for Physical Activity. Autoregressive correlations between measurements separated by more than one month have been excluded from the figure for reasons of parsimony. Correlations can be found in Table 8.